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CLAIMS

1. A pigment product suitable for use in a coating composition to provide a gloss coating on paper, the
5 pigment product comprising a processed particulate kaolin whose particles have a particle size distribution such that at least 80% by weight of the particles have an equivalent spherical diameter less than $2\mu\text{m}$ and not less than 8% by weight of the
10 particles have an equivalent spherical diameter less than $0.25\mu\text{m}$ and whose particles have a shape factor of at least 45.
2. A pigment product as claimed in claim 1 and wherein at least 12% by weight of the particles of the
15 product have an equivalent spherical diameter less than $0.25\mu\text{m}$.
3. A pigment product as claimed in claim 1 and wherein at least 84% by weight of the particles have an equivalent spherical diameter less than $2\mu\text{m}$, and at
20 least 60% by weight of the particles have an equivalent spherical diameter less than $1\mu\text{m}$.
4. A pigment product as claimed in claim 1, claim 2 or claim 3 and wherein from 15% to 35% by weight of the particles have an equivalent spherical diameter less
25 than $0.25\mu\text{m}$.
5. A pigment product as claimed in any one of the preceding claims and wherein at least 50% by weight of the particles have an equivalent spherical diameter in the range of from $0.75\mu\text{m}$ to $0.25\mu\text{m}$.

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6. A pigment product as claimed in any one of the preceding claims and wherein the mean equivalent spherical diameter of the particles of the product is from 0.3 μ m to 0.8 μ m.
- 5 7. A pigment product as claimed in any one of the preceding claims and wherein the shape factor of the particles of the pigment product is at least 50.
8. A pigment product as claimed in claim 7 and wherein the shape factor of the particles is from 55 to
10 65.
9. A method of producing a pigment product as claimed in any one of claims 1 to 8 and which method comprises the steps of:
- (a) mixing a raw or partially processed kaolin clay
15 with water to form an aqueous suspension;
- (b) subjecting the suspension produced by step (a) to attrition grinding using a particulate grinding medium by a process in which the average shape factor of the kaolin clay is increased by at least 10;
- 20 (c) separating the suspension of kaolin clay ground in step (b) from the particulate grinding medium; and
- (d) dewatering the suspension of ground kaolin clay separated in step (c) to recover a pigment product therefrom.
- 25 10. A method as claimed in claim 9 and wherein the kaolin clay employed in step (a) comprises a sedimentary kaolin clay.
11. A method as claimed in claim 10 and wherein the kaolin clay employed in step (a) consists of particles

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having an equivalent spherical diameter such that not more than 40% by weight have an equivalent spherical diameter larger than $10\mu\text{m}$, and not more than 50% by weight have an equivalent spherical diameter less than
5 $2\mu\text{m}$.

12. A method as claimed in claim 10 or claim 11 and wherein the particles of the kaolin clay in step (a) have a shape factor of not greater than 15.

13. A method as claimed in any one of claims 9 to 12
10 and wherein the method includes at least one additional treatment step.

14. A method as claimed in claim 13 and wherein the method includes between step (a) and step (b) an additional purification step comprising froth flotation
15 or magnetic separation or both.

15. A method as claimed in claim 13 or claim 14 and wherein the additional treatment step includes liquid working following step (c) or step (d).

16. A method as claimed in claim 12, claim 13, claim
20 14 or claim 15 and wherein the method includes in the process of step (b) prior to the said grinding an additional comminution stage to provide delamination of the particles of the raw kaolin clay.

17. A method as claimed in claim 16 and wherein the
25 additional comminution stage comprises wet grinding in a suspension containing not more than 40% by weight solids, the wet grinding being carried out using a particulate grinding medium under conditions in which no substantial vortex is set up in the suspension.

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18. A method as claimed in claim 16 or claim 17 and wherein the energy dissipated during the additional comminution stage is less than 75kWh per tonne of kaolin present on a dry weight basis.
- 5 19. A method as claimed in any one of claims 9 to 18 and wherein in step (b) grinding following the additional comminution stage is carried out under conditions wherein a vortex is formed in the aqueous suspension treated.
- 10 20. A method as claimed in claim 19 and wherein in the grinding following the additional comminution stage the energy dissipated is from 40kWh to 120kWh per tonne of kaolin clay present on a dry weight basis.
21. A method as claimed in any one of claims 9 to 20
- 15 and wherein there is added from 99 to 50 parts by weight of the kaolin clay with from 1 to 50 parts by weight of a further kaolin clay having a shape factor of at least 15 and having at least 85% by weight of its particles smaller than $2\mu\text{m}$ and at least 20% by weight
- 20 of its particles smaller than $0.25\mu\text{m}$.
22. A method as claimed in claim 21 and wherein the further kaolin clay is added prior to step (b).
23. A method as claimed in claim 21 and wherein the further kaolin clay is added following step (c) or step
- 25 (d).
24. A coating composition for use in producing gloss coatings on paper and other substrates, which composition comprises an aqueous suspension of a particulate pigment together with a hydrophilic

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adhesive, wherein the particulate pigment comprises a pigment product as claimed in any one of claims 1 to 8.

25. A composition as claimed in claim 24 and wherein the adhesive forms from 4% to 30% of the solids of the composition on a dry weight basis.

26. A composition as claimed in claim 23 or claim 24 and wherein the solids content of the composition is from 60% to 90% by weight of the composition.

27. A composition as claimed in any one of claims 24 to 26 and wherein at least 80 per cent by weight of the particulate pigment of the composition comprises the pigment product claimed in any one of claims 1 to 8.

28. A composition as claimed in any one of claims 24 to 27 and wherein the adhesive comprises a modified or unmodified starch.

29. A composition as claimed in any one of claims 24 to 28 and wherein the adhesive comprises a binder other than starch.

30. A method of use of the coating composition claimed in any one of claims 24 to 29 which comprises applying the composition to coat a sheet of paper and calendering the paper to form a gloss coating thereon.

31. A method of treating a kaolin clay to increase the particle fineness and shape factor thereof which includes the steps of:

(a) treating an aqueous suspension of the clay by a first comminution process to give delamination of the clay, in which an energy of not more than 75kWh per tonne of clay on a dry weight basis is dissipated;

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(b) treating the clay after delamination in step (a) by a second comminution process to give particle comminution in which an energy of from 40 to 120kWh per tonne of clay on a dry weight basis is dissipated.

- 5 32. A method as claimed in claim 31 and wherein step (a) is carried out in a medium grinding mill in which no vortex is established and step (b) is carried out in a medium grinding mill in which a vortex is established.